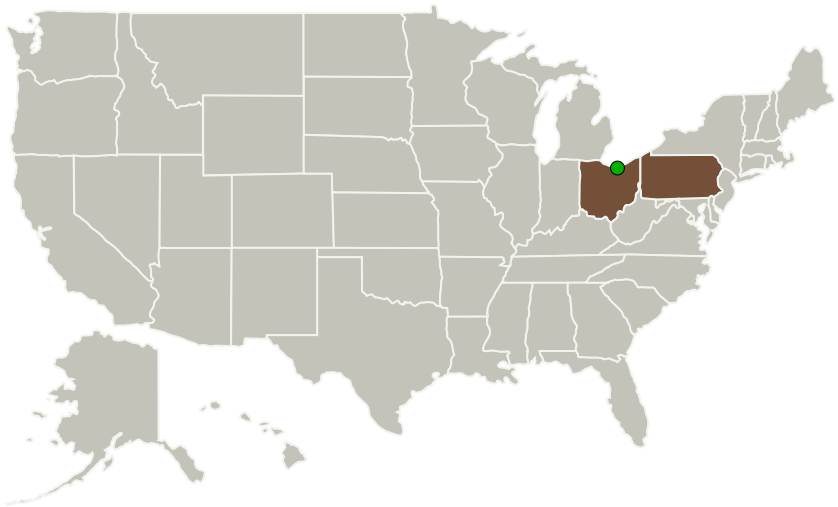
# Titanium Heat Pipe Thermal Plane, Phase II

Completed Technology Project (2010 - 2012)

## Project Introduction

The objective of the Phase II program is to complete the development of the titanium heat pipe thermal plane and establish all necessary steps for production of this heat pipe. The main aerospace application for this titanium heat pipe design is fuel cell thermal management. Electronics cooling is expected to be the largest commercial market for this technology. The Phase I program was successfully completed five weeks sooner than deadline. All main technical objectives were met. Three thermal plane units were produced and thermally tested. One unit was shipped to NASA GRC and one unit is currently in a "burn-in" setup for Non-Condensable Gas (NCG) generation prevention. NCG generation still remains the most important issue to be resolved before heat pipe will be ready for production. Another limiting factor for wide commercial application of the titanium heat pipes is their high manufacturing cost. These issues will be addressed in the Phase II program. The Phase II work effort is divided into eleven tasks: ten technical tasks plus one reporting task. The work involves reviewing requirements, thermal plane design, alternative materials development, design optimization, non-condensable gas abatement concluding with the fabrication test and delivery of several titanium thermal planes to NASA. All tasks will be accomplished at Thermacore, Inc. facility.

## Primary U.S. Work Locations and Key Partners

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| Organizations Performing Work | Role | Type | Location |
|---|---|---|---|
| Thermacore, Inc. | Lead Organization | Industry | Lancaster, Pennsylvania |
| Glenn Research Center(GRC) | Supporting Organization | NASA Center | Cleveland, Ohio |

| Primary U.S. Work Locations | |
|---|---|
| Ohio | Pennsylvania |

## Project Transitions

**January 2010:** Project Start

**September 2012:** Closed out

**Closeout Documentation:**

- Final Summary Chart*(https://techport.nasa.gov/file/137527)*

## Organizational Responsibility

**Responsible Mission Directorate:**

Space Technology Mission Directorate (STMD)

**Lead Organization:**

Thermacore, Inc.

**Responsible Program:**

Small Business Innovation Research/Small Business Tech Transfer

## Project Management

**Program Director:**

Jason L Kessler

**Program Manager:**

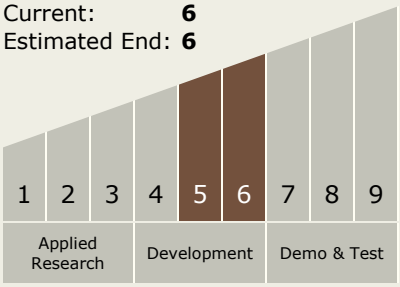
Carlos Torrez

**Principal Investigator:**

Sergey Semenov

## Technology Maturity (TRL)

Start: **5**
Current: **6**
Estimated End: **6**



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## Technology Areas

**Primary:**

- TX14 Thermal Management Systems
  - TX14.2 Thermal Control Components and Systems
    - TX14.2.3 Heat Rejection and Storage

## Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System